## STAT 291 - Statistics for the Mathematical Sciences I

## Problems using the Normal Distribution

1. Assume the length of time between charges of a cellular phone is normally distributed with a mean of 10 hours and a standard deviation of 1.5 hours. Find the probability that the cell phone will last between 8 and 12 hours between charges.
2. Suppose an automobile manufacturer introduces a new model that has an advertised mean in-city mileage of 27 miles per gallon. Although such advertisements seldom report any measure of variability, suppose you are able to discover that the standard deviation is 3 miles per gallon. If the distribution is approximately normal, what is the probability that a particular car will average less than 20 miles per gallon for in-city driving? Would getting less than 20 miles per gallon cause you to doubt the accuracy of their claim?
3. Suppose the scores on a college entrance examination are normally distributed with a mean of 550 and a standard deviation of 100. A certain prestigious university will consider only those applicants whose scores exceed the 90 th percentile of the distribution. Find the minimum score an applicant must achieve in order to receive consideration for admission to the university.
4. The physical fitness of a patient is often measured by the patient's maximum oxygen uptake. The mean maximum oxygen uptake for cardiac patients who regularly participate in sports or exercise programs was found to be 24.1 with a standard deviation of 6.30 . Assuming this distribution is normal, answer the following:
(a) What is the probability that a cardiac patient who regularly participates in sports has a maximum oxygen uptake of at least 20 ?
(b) What is the probability that a cardiac patient who regularly exercises has a maximum oxygen uptake of 10.5 or lower?
(c) Consider a cardiac patient with a maximum cardiac uptake of 10.5. Is it likely that this patient participates in sports or exercise programs? Explain.












